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The Latin American Dialysis and Renal Transplantation Registry Annual Report 2002

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The Latin American Dialysis and Renal Transplantation Registry Annual Report 2002. Latin America is a conglomerate of adjacent countries having in common a Latin extraction and language (Spanish or Portuguese) and exhibiting extreme variations in socioeconomic status. The Latin American Society of Nephrology and Hypertension Dialysis and Renal Transplantation Registry was created in 1991. Annual data are sent by local societies in 3 forms: patient, center, and country. The prevalence of renal replacement therapy (RRT) (all modalities) increased from 119 patients per million population (pmp) in 1991 to 349 pmp in 2001; the acceptance rate was 91.7 pmp in 2001. Dialysis prevalence was 277 pmp; hemodialysis was the predominant modality, except in Mexico (86% on peritoneal dialysis). The highest dialysis prevalence and acceptance rates were reported by Puerto Rico, Uruguay, and Chile. Among incident patients, diabetic nephropathy (33%) and nephroangioesclerosis (32%) were the primary causes; 38% were older than 65 years old. Renal transplants increased from 3.7 pmp in 1987 to 13.7 pmp in 2001. In 2003, 6357 transplants were performed (55% living donor); the cumulative number performed since 1987 reached 55,947. Prevalence and incidence are low because not all patients with end-stage renal disease have access to RRT because of restricted availability, difficulties in referral, and inequities in coverage. The annual increase in the number of patients on RRT (8%–10%) is higher, proportionally, than the annual growth of the Latin American population in general (1.5%). Efforts must be focused on prevention and treatment of chronic kidney disease, especially in diabetic and older patients, and in implementing better organ donation programs to improve the pool of cadaveric donors.

Resumen

América Latina es un conjunto de naciones que tienen en común su origen latino, su idioma (Español o Portugués), así como la grave desigualdad social y económica de sus habitantes. El Registro de Diálisis y Trasplante Renal de la SLANH se inició en 1991. La información anual generada es enviada por las sociedades de nefrología locales en tres formularios: por paciente, por centro y por país. La prevalencia de pacientes en terapia de reemplazo de la función renal (TRR) en todas sus formas, se incrementó de 119 pacientes por millón de habitantes (pmh) en 1991 a 349 pmh en 2001; la tasa de aceptación fue de 91.7 pmh y la prevalencia en diálisis de 277 pmh en el año 2001. La hemodiálisis es la forma de tratamiento más utilizada, excepto en México, donde el 86% utiliza la diálisis peritoneal. Las tasas más altas de aceptación y prevalencia se registran en Puerto Rico, Uruguay y Chile. En los pacientes incidentes, la nefropatía diabética (33%) y la nefroesclerosis (32%), fueron las causas más frecuentes de falla renal; el 38% de ellos tenían más de 65 años de edad. La frecuencia de trasplante renal se incrementó de 3.7 pmh en 1987 a 13.7 pmh en 2001. En este último año se practicaron 6,357 trasplantes, el 55% de ellos de donante vivo; la cifra acumulada desde 1987 alcanzó los 55,947 trasplantes practicados. La prevalencia e incidencia son bajas debido que no todos los pacientes tienen acceso a la TRR; ya sea por una disponibilidad limitada de programas. problemas en la derivación. El aumento anualizado en el número de pacientes en TRR (8%-10%) es proporcionalmente mayor que el crecimiento de la población en general (1.5%) en la región. Nuestros esfuerzos se deben reorientar hacia la prevención y tratamiento de la enfermedad renal crónica, especialmente en el paciente diabético y el de mayor edad, así como el establecimiento de mejores sistemas de procuración de órganos para aumentar el número de donantes cadavéricos.

Latin America is a conglomerate of adjacent countries which have in common a Latin extraction and language, either Spanish or Portuguese. It comprises Mexico, in North America, countries in Central and South America, and the Spanish Islands of the Caribbean. It is a heterogeneous region, with countries that exhibit extreme variations in socioeconomic status. The gross national income in 2001 was US $3550 per capita, but it ranged from 480 in Haiti to 10,550 in Puerto Rico; total life expectancy was 70.5 years but, again, the range was wide, from 52.4 years in Haiti, 63 in Bolivia, and 76 in Puerto Rico. Similar differences can be seen in the human development index, which was 0.777 for the whole region but varied from 0.467 in Haiti and 0.606 in Mexico to 0.849 in Argentina [1, 2].

The Latin American population, estimated at 519,200,000 in 2001, increases 1.5% annually, and people under 65 years of age make up 5.6% of the total [1]. Most of the inhabitants are of Caucasian origin, descending from Spanish and Portuguese. The aboriginal people

Key words: epidemiology end-stage renal disease in Latin America, renal replacement therapy in Latin America.

Table 1. Distribution of aboriginal people in Latin America

Country	No. of aboriginals	Total population (%)
Bolivia	4,400,000	55
Peru	10,000,000	45
Guatemala	5,000,000	44
Mexico	30,000,000	30
Ecuador	3,500,000	25
El Salvador	300,000	5
Chile	450,000	3
Costa Rica	36,000	1
Argentina	1,000,000	3

sum about 40 million individuals, divided in more than 400 ethnic groups, and constitute 27% of the rural population. In Bolivia, more than half of the total population is indigenous. (Table 1) [3]. In Brazil, the largest minority groups comprise blacks and mulattos (45%), with indigenous people being less than 0.5% [4].

The Latin American Society of Nephrology and Hypertension (SLANH) is comprised of the National Societies of Nephrology of 20 Latin American countries (Table 2); these countries include a population of 509,565,697 inhabitants. The SLANH Dialysis and Renal Transplantation Registry was created in 1991. Since then, 8 reports have been published [5–13]. The data are collected, at the request of the Coordinating Committee, from each local society of nephrology. Many of these national registries are voluntary. Transplantation data are obtained in conjunction with the Transplantation Society of Latin America and the Caribbean, the society that maintains the Latin American Transplantation Registry, under the directorship of Eduardo Santiago Delpin and Valter Duro Garcia (available at *www.abto.org.br*). Data are gathered in 3 forms: patient, center, and country; the database is updated every year.

Although limited, the information obtained by this registry has improved our knowledge of renal replacement treatment (RRT) in Latin America, stimulated the development of national registries, and allowed us to compare the results of these therapies in patients of this region with patients of other regions. The 2002 report includes data from the years 2000 and 2001. Dialysis data were obtained from 14 of the 20 countries (where 90% of the SLANH population lives), whereas kidney transplantation data came from 18 of the 20 countries, where 96% of the SLANH population is located. Trends in RRT are also described in this report.

RRT in Latin American countries has shown a progressive increase in the last 10 years (Fig. 1). The prevalence of all treatment modalities increased from 119 patients per million population (pmp) in 1991 to 349 pmp in 2001 (Fig. 1) [5–13].

According to information sent by each country, of the 164,538 patients undergoing RRT as of December 31, 2001, 92,767 (56.4%) were on hemodialysis, 37,727 (23%) were on peritoneal dialysis, and 34,044 (20.7%) were living with a functioning transplanted kidney. (Table 2).

However, prevalence data on RRT must be interpreted with caution because specific countries providing data in each year are different, and the percentage of patients on various types of RRT reported in each country is different from year to year. But if one takes into account only countries that report every year (such as Argentina, Chile, Uruguay, Venezuela, and Puerto Rico), the ascending trend in prevalence is similar. In fact, the only country that showed a tendency to level out in the last 4 reports was Puerto Rico, with prevalence consistently over 950 pmp.

The prevalence rate of hemodialysis in the 14 countries that provided data (population of 461,913,654 inhabitants) was 277.1 pmp in 2001. Hemodialysis was the predominant modality, except in Mexico, where 86% of the patients on dialysis were on peritoneal dialysis treatment (Fig. 2). The highest prevalence rate of dialysis was reported by Puerto Rico and Uruguay, with 843 and 689 pmp, respectively; prevalence rates in Argentina, Chile, and Mexico ranged between 300 and 600 pmp. Only 2 countries, Costa Rica and Paraguay, had very low prevalence rates—under 100 pmp.

In these 14 countries, only 20.6% of the patients on RRT had a functioning renal transplant (Fig. 3).

Given the large socioeconomic heterogeneity (Table 2), it is not surprising that a linear correlation can be observed between RRT and gross national income per capita (in US dollars) (Fig. 4).

During 2001, the acceptance rate of new patients was 91.4 pmp in all countries, and with a wide variation (Fig. 5). Puerto Rico, Chile, and Uruguay (298.5, 127.3 and 122.1 pmp, respectively) were the countries with the highest acceptance rates, whereas Paraguay (25.6 pmp) and Ecuador (9.6 pmp) had the lowest.

The number of new cases of patients with end-stage renal disease (ESRD) continues to rise, from 27.8 pmp in 1992 to 57 pmp in 1997 and 91.4 pmp in 2001. These rates should be interpreted with caution, because only 9 countries provided data in 1992, 13 in 1997, and 14 in 2001.

Nevertheless, 2 trends can be observed in incident patients on dialysis: (*1*) Diabetic nephropathy has become the primary cause of ESRD (33%) and is increasing yearly (Figs. 6 and 7), being as high as 65.9% among new patients in Puerto Rico [2–9]. Nephroangiosclerosis comes in second at 32%. These two diagnoses accounted for 65% of new patients with ESRD. (*2*) The number of older patients initiating dialysis has continued to increase with patients older than 65 years of age constituting more than 38% of new patients. Patients 75 years and older are increasing as well (Fig. 8).

Table 2. Prevalence of RRT in Latin America (SLANH countries)

Country	Total population millions [1]	Life expectancy [1]	GNI [1]	HDI [2]	Prevalence			
					Patients on HD	Patients on PD	Patients with grafts	Prevalence (pmp)
Argentina	36,26	74	7460	0.849	16200	500	4000	570,87
Bolivia	8,27	63	900	0.672	–	–	–	–
Brazil	177,75	68	3610	0.777	43700	5106	14314	355,10
Chile	15,31	76	4810	0.831	7744	334	2066	662,64
Colombia	42,32	71	2020	0.779	4202	3593	1262	214,01
Costa Rica	3,90	77	3820	0.832	100	25	454	148,46
Cuba	11,25	76	5259	0.806	1150	100	814	183,45
Ecuador	12,20	70	3280	0.731	1325	168	168	3615
El Salvador	6,4	70	2000	0.719	–	–	–	–
Guatemala	10,80	65	1690	0.652	547	793	328	154,44
Honduras	6,1	69	860	0.667				
Mexico	97,48	73	5100	0.606	4162	25570	7015	376,96
Nicaragua	4,92	69	2450	0.643	–	–	–	–
Panama	2,85	75	3920	0.788	–	–	–	–
Paraguay	5,73	70	1520	0.751	347		80	74,47
Peru	26,10	69	2060	0.752	3191	481	1275	189,54
Puerto Rico	3,92	76	10550	0.737	2869	431	559	985,44
Dominican Republic	8,1	67	2120	0.737	–	–	–	–
Uruguay	3,40	74	6600	0.834	2217	126	409	809,41
Venezuela	24,63	73	4310	0.775	5013	500	1300	276,62
Total	507,69				92767	37727	34044	349,30

Abbreviations are: RRT, renal replacement therapy; SLANH, Latin American Society of Nephrology and Hypertension; GNI, gross national income; HDI, human development index; HD, hemodialysis; PD, peritoneal dialysis.

Note: Bolivia, El Salvador, Honduras, Panama, Dominican Republic, and Nicaragua did not report during the years of 2000 to 2001. Their previous known prevalence was: Bolivia, 19.3 pmp in 1992; El Salvador, 55 pmp in 1995; Honduras, 32.8 pmp in 1997; Dominican Republic, 59.8 pmp in 1999 [13].

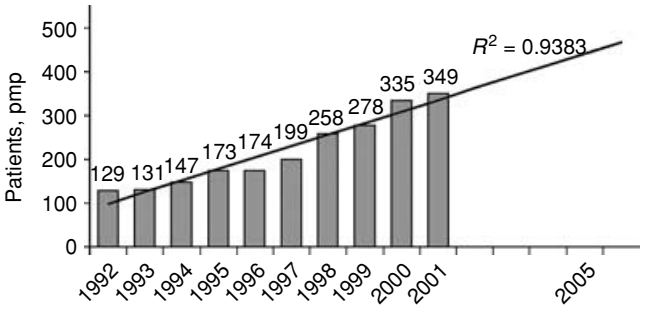


Fig. 1. Prevalence of RRT (all modalities) from 1992 to 2001. The line shows the trend and predicted prevalence in 2005.

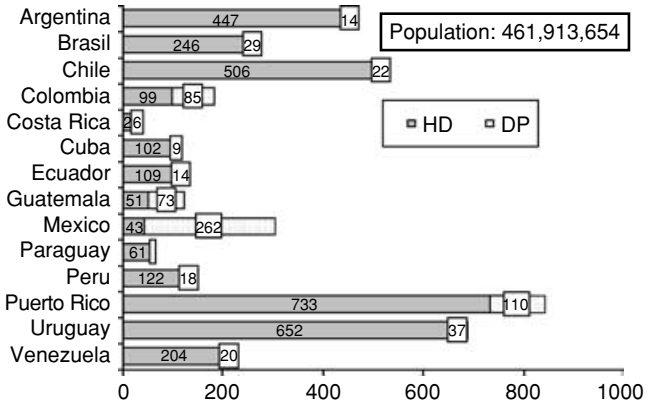


Fig. 2. Point prevalence of hemodialysis and peritoneal dialysis on December 31, 2001.

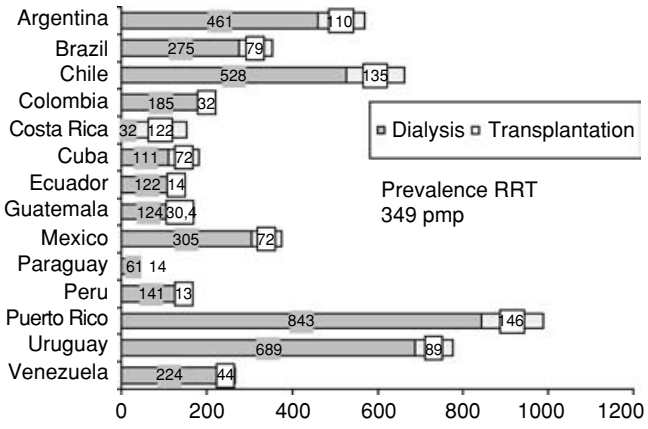


Fig. 3. Total RRT prevalence in Latin America. Dialysis and transplantation by country.

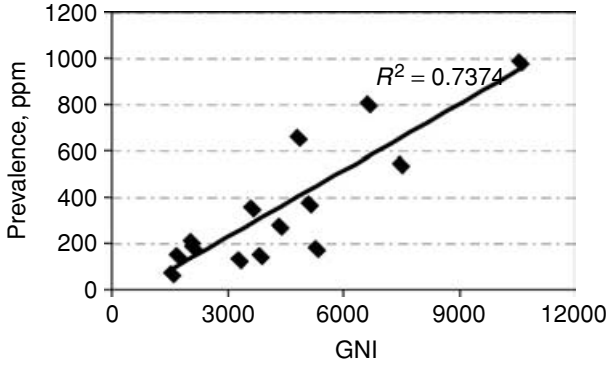


Fig. 4. Linear correlation between gross national income (per capita in US dollars) and prevalence of RRT in 2001 (all modalities).

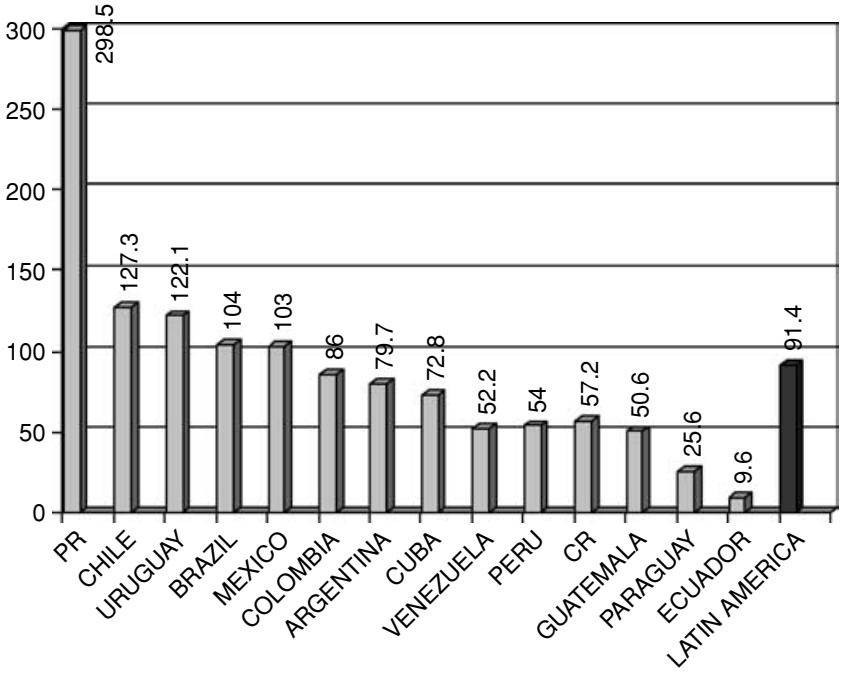


Fig. 5. Acceptance rate of new patients by country during 2001. Black column represents rate for Latin America.

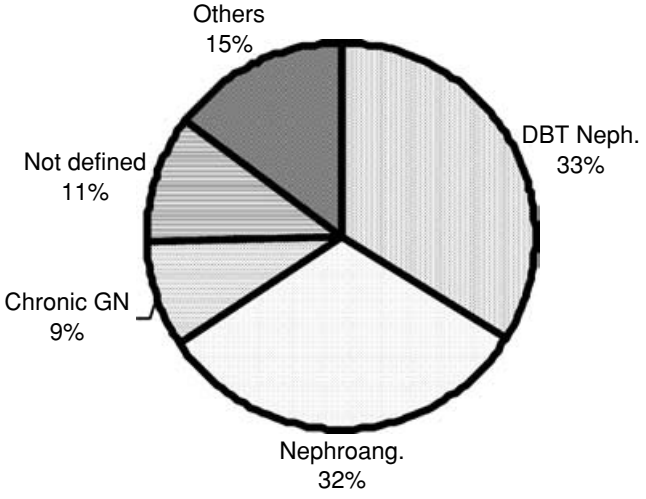


Fig. 6. Etiology of patients with incident in 2001.

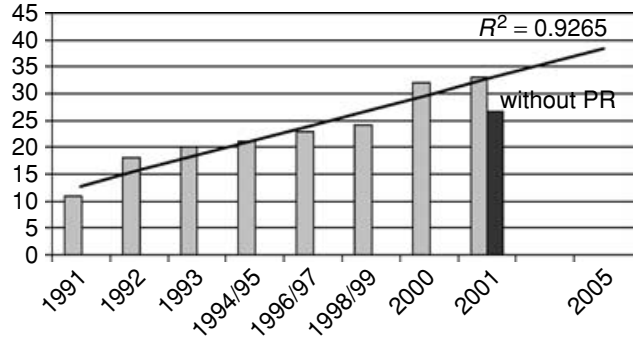


Fig. 7. Incident patients with diabetes, 1991–2001 ($N = 18,486$ patients with incident). Black column is 2001 incidence, excluding Puerto Rico. The line marks the trend.

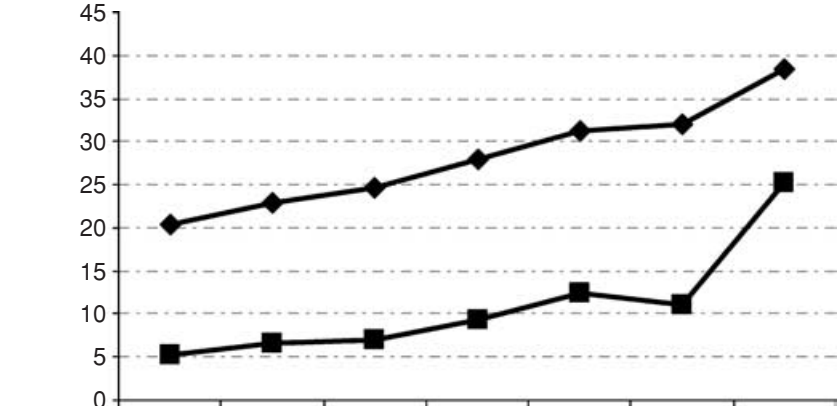
These two tendencies are actually taking place all over the world. Diabetic nephropathy accounts for 45% of new patients in the United States [14], 25% in Australia, 37% in New Zealand [15], 22.4% in the 2001 European Renal Association-European Dialysis and Transplant Association Report [16], and 36.6% in Japan [17]. Patients 65 years and older constitute 49.3% of incident cases in the United States [14], 31% in Europe [16], 43% in Australia [15], and 53% in Japan [17].

Vascular disease (cardiovascular or cerebrovascular) was the major cause of death in patients on dialysis (40% of total deaths), followed by infections (20%). Withdrawal from treatment was only 7% in the Latin American population (Fig. 9).

The adjusted mortality rate in Latin American countries was 26.4 per 100 patients per year in patients with type 1 diabetes mellitus and significantly less in patients without diabetes (12.4 by 100 patients per year) (Fig. 10) [13].

Kidney transplantation has been performed in Latin America for almost 45 years. Argentina conducted its first transplantation in a patient in 1957, Mexico in 1963, Brazil in 1964, and Colombia in 1965. Overall, kidney transplants are performed in all 20 countries that constitute the SLANH.

The increase in the number of renal transplants is shown in Figure 11: from 3.7 pmp in 1987 to 13.7 pmp in 2001. The highest transplant rates were reported in Costa Rica (27.7 pmp), Uruguay (18.8 pmp), and Puerto Rico (23.2 pmp). The total number of renal transplants performed in 2001 was 6357. The cumulative number of kidney transplants reached 55,947 in 2001 (Fig. 12). Brazil



	92	93	94	95	96/97	98/99	2000/2001 *
>65 a	20,4	22,8	24,6	27,9	31,3	32	38,4
>75 a	5,2	6,6	7	9,4	12,5	11,1	25,2

Fig. 8. Percentage of patients older than 65 and 75 years of age from 1992–2001 (* $N = 8926$ patients in 5 countries).

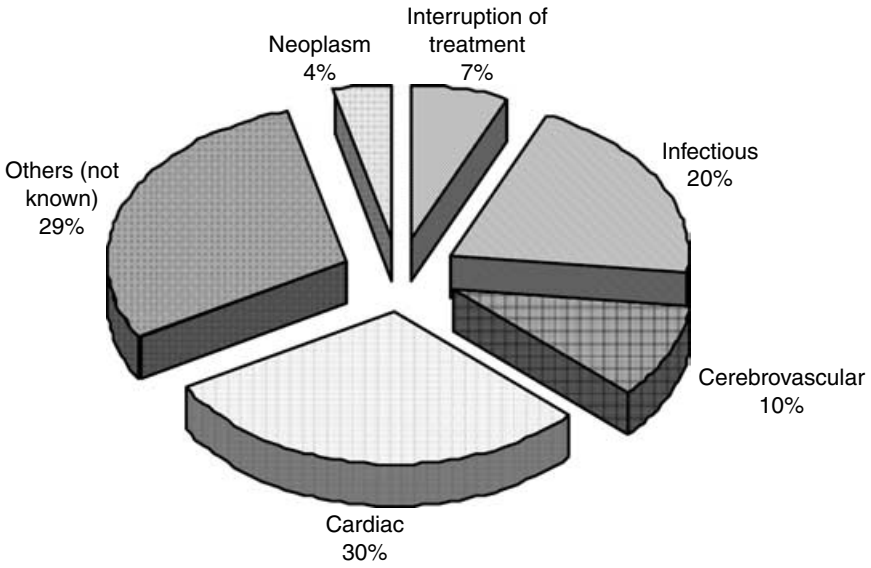


Fig. 9. Causes of death (1991–1999).

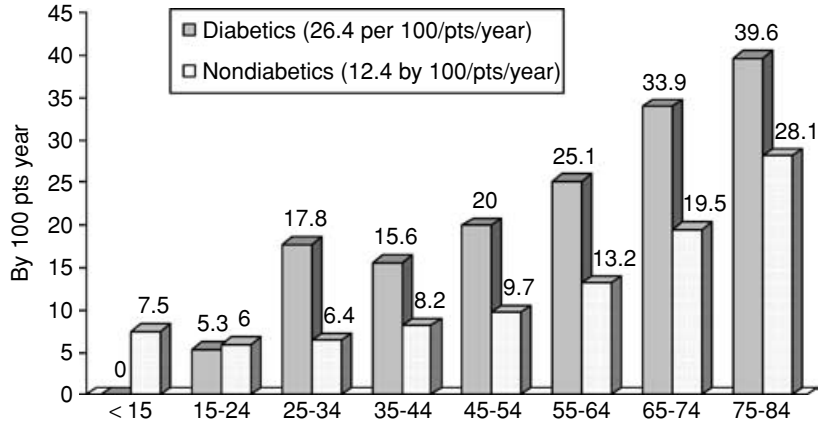


Fig. 10. Mortality by 100 patients per year, adjusted by age and diabetes, 1996–1999.

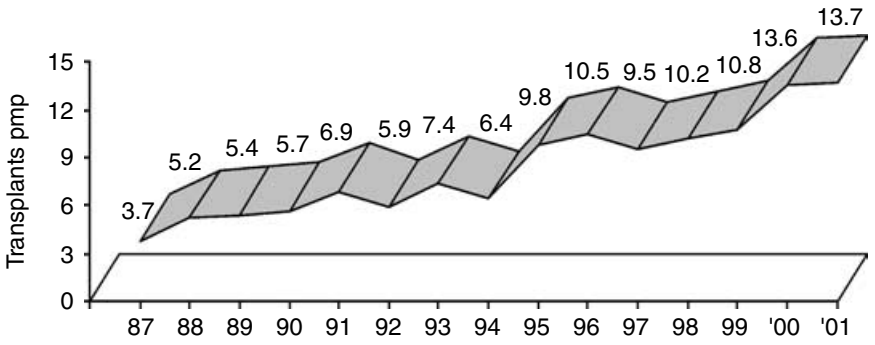


Fig. 11. Latin American transplantation rate in pmp, 1987–2001.

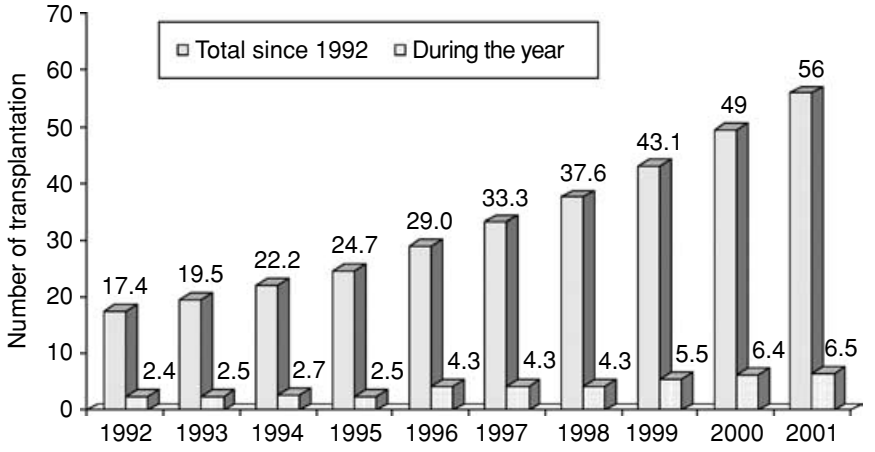


Fig. 12. Registered kidney transplants (in thousands) 1992–2001.

contributed nearly half of the renal transplants in the region.

The number of deceased donor renal transplants has grown over the last decade, but living donor transplants predominated in 2001 (55%). However, in several countries, such us Argentina, Chile, Colombia, Cuba, Puerto Rico, Uruguay, and Venezuela, deceased donor kidney transplants exceeded living donor transplants.

Kidney-pancreas transplants are performed increasingly for type 1 diabetic nephropathy in Argentina and Brazil. Kidney-liver and kidney-heart transplants are also occasionally performed (Table 3).

Infection continues to be the most frequent cause of death in patients with kidney transplants (42%), followed by cardiac causes (22%) (Fig. 13). [13]

There is no reason to presume that ESRD is less frequent in Latin America than in other parts of the world. Although there is probably a sub registry, low rates of prevalence and incidence observed may be due to the fact that, in many countries of the region, access to RRT is limited. Data collected by the SLANH Registry indicate that in Latin American countries RRT may not reflect true ESRD incidence, because in many countries there are not adequate resources to provide treatment for ESRD. As shown in Figure 4, the richest countries have higher ESRD prevalence rates.

Insurance coverage varies from country to country. In Argentina, Chile, Cuba, Uruguay, Brazil, and Venezuela, access to RRT is assured. But less than 20% and approximately 30% of patients in Paraguay and Peru, respectively, are covered by the social security system.

CONCLUSIONS

The rate of increase in the number of ESRD patients is higher than that of the general population in Latin America (8%–10% per year vs. 1.5%). It is predicted that by 2005 the ESRD prevalence rate in the region will exceed 450 pmp.

Because diabetic nephropathy has become the primary cause of ESRD, the number of new ESRD cases will continue to rise unless the prevalence of diabetes in the general population is stabilized and treatment of diabetic nephropathy is optimized. However, the segment of the general population over 65 years old is increasing, and they have a higher prevalence of chronic kidney disease. Therefore, there is need for treatment approaches to prevent or retard progression of kidney disease, thus reducing the number of patients that will need RRT in the future.

Better organ procurement programs are needed to increase the pool of kidneys available for transplantation.

Table 3. Double organ transplantation in Latin America

Double transplantation 2000–01	Argentina	Brazil	Colombia	Cuba
Kidney-pancreas	17	129	8	4
Kidney-liver	3		1	
Kidney-heart	1		1	

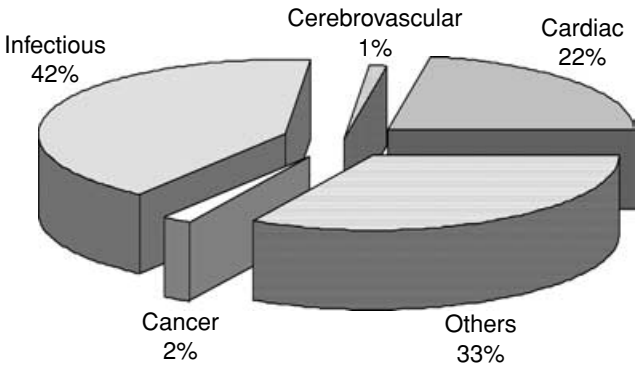


Fig. 13. Causes of death in patients who underwent transplantations, 1993–1999.

Finally, differences in socioeconomic status lead to unequal access to health care. Therefore, programs are needed to extend full coverage to all who require RRT.

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